

VI. He who knows perfectly the Method of making *Phosphorus*, can choose whether he will sublime his *Magma* of Urine into *Phosphorus*, or into Sulphur; for the Difference consists only in the *Encheiresis*.

III. *Observations of the Appearances among the Fix'd Stars, called Nebulous Stars. By W. Derham, D. D. Canon of Windsor, F. R. S.*

HAVING last Autumn made some good Observations, with my eight Foot Reflecting Telescope, of the Appearances in the Heavens, called *Nebulous Stars*, I think it proper to acquaint this Illustrious Society with them, to instigate others to make farther Observations of them, because I think there is much more in them worthy of the Inquiry of the Curious, than hath hitherto been imagined, and because I fear I shall not be able to pursue my Observations much farther, by reason my Reflector loseth its Excellence and Power, by beginning to be tarnished.

But if any one would have a good View of these *Nebulosæ*, it is of absolute Necessity that he makes use of very good Glasses, else all his Labour will be lost, as I found by Experience.

These Appearances in the Heavens, have born the Name of *Nebulous Stars*: But neither are they *Stars*, nor such Bodies as emit, or reflect Light, as the

the Sun, Moon, and Stars do ; nor are they *Congeries*, or *Clusters* of Stars, as the *Milky-Way* : but whitish *Areae*, like a Collection of *Misty Vapours* : whence they have their Name.

There are many of them dispersed about, in diverse Parts of the Heavens. This Catalogue of them (which I transcribed from *Hevelius's Prodrromus Astronomiae*) may be of good use to such as are minded to enquire into them.

A CATALOGUE of the *Nebulosæ*, extracted from
Hevelius.

The Places of the <i>Nebulosæ</i> .	Their R. Asc. cent. <i>A.</i> 1660.			Their Declinat. <i>A. D.</i> 1660.		
	gr.	'	"	gr.	'	"
In <i>Andromeda's</i> Girdle,	6	4	45	39	27	57 N.
In Forehead of <i>Capricorn</i> ,	300	2	53	20	1	53 S.
Another preceding the Eye of <i>Capricorn</i> ,	301	59	55	19	11	30 S.
Another following it,	302	35	9	19	36	0 S.
One above those, adjoining to the Eye of <i>Capricorn</i> ,	302	25	31	18	48	58 S.
Preceding above the <i>Swan's</i> Tail, and last in its N. Foot,	304	54	8	47	54	20 N.
One following a Star above the <i>Swan's</i> Tail, out of the Constellation,	312	10	5	53	05	20 N.
On the outside of <i>Hercu- les's</i> left Foot,	264	52	46	48	9	10 N.
In the left Leg of <i>Hercules</i> ,	265	38	37	38	5	50 N.
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The Places of the <i>Nebulosæ</i> .	Their R. Af- cent. <i>A.</i> 1660.			Their Declinat. <i>A. D.</i> 1660.		
	gr.	'	"	gr.	'	"
On the Top of <i>Hercu-</i> <i>les's</i> Head,	252	24	3	13	18	37 N.
At the Ear of <i>Pegasus</i> ,	332	38	45	3	3	12 N.
In the Western Border of <i>Sobieski's</i> Shield,	272	32	34	14	23	35 S.
Under the Beam of the Scales of <i>Libra</i> ,	219	26	15	9	16	27 S.
Above the Back of <i>Urfa</i> <i>major</i> ,	183	32	41	60	20	33 N.
In the third Joint of <i>Scor-</i> <i>pio's</i> Tail,	12	43	00	19	1	0
			↗ Long.			S. Lat.
Between <i>Scorpio's</i> Tail, and the Bow of <i>Sagit-</i> <i>tarius</i> ,	24	32	00	11	25	0
			↗ Long.			S. Lat.

Besides these Dr. *Halley*, in *Phil. Transf.* N° 347, hath mentioned one in *Orion's Sword*; another in *Sagittary*; a third in the *Centaur* (never seen in *England*) a fourth preceding the right Foot of *Antinous*; a fifth in *Hercules*; and that in *Andromeda's Girdle*.

Five of these six I have carefully viewed with my excellent eight Foot Reflecting Telescope, and find them to be Phænomena much alike; all except that preceding the right Foot of *Antinous*, which is not a *Nebulose*, but a *Cluster* of *Stars*, somewhat like that which is in the *Milky-Way*.

Between

Between the other four, I find no material Difference, only some are rounder, some of a more oval Form, without any Fix'd Stars in them to cause their Light; only that in *Orion*, hath some Stars in it, visible only with the Telescope, but by no Means sufficient to cause the Light of the *Nebulosæ* there. But by these Stars it was, that I first perceived the Distance of the *Nebulosæ* to be greater than that of the *Fix'd Stars*, and put me upon enquiring into the rest of them. Every one of which I could very visibly, and plainly discern, to be at immense Distances beyond the *Fix'd Stars* near them, whether visible to the naked Eye, or Telescopic only; yea, they seemed to be as far beyond the *Fix'd Stars*, as any of those Stars are from the Earth.

And now from this Relation of what I have observed from very good, and frequent Views of the *Nebulosæ*, I conclude them certainly not to be *Lucid Bodies*, that send their Light to us, as the Sun and Moon. Neither are they the *combined Light* of *Clusters* of Stars, like that of the *Milky-Way*: But I take them to be *vast Areaæ*, or *Regions of Light*, infallibly *beyond the Fix'd Stars*, and *devoid of them*. I say *Regions*, meaning Spaces of a vast Extent, large enough to appear of such a Size as they do to us, at so great a Distance as they are from us.

And since those Spaces are devoid of Stars, and even that in *Orion* itself, hath its Stars bearing a very small Proportion to its *Nebulosæ*, and they are visibly not the Cause of it, I leave it to the great Sagacity and Penetration of this Illustrious Society, to judge whe-

ther these *Nebulosæ* are particular Spaces of Light; or rather, whether they may not, in all Probability, be Chasms, or Openings into an immense Region of Light, beyond the Fix'd Stars. Because I find in this Opinion most of the Learned in all Ages (both Philosophers, and I may add Divines too) thus far concurred, that there was a *Region beyond the Stars*. Those that imagined there were *CrySTALLINE*, or *Solid Orbs*, thought a *Cœlum Empyræum* was beyond them and the *Primum Mobile*: and they, that maintained there were no such Orbs, but that the Heavenly Bodies floated in the *Æther*, imagined that the Starry Region was not the Bounds of the Universe, but that there was a Region beyond that, which they called the *Third Region*, and *Third Heaven*.

To conclude these Remarks, it may be of use to take Notice, that in *Hevelius's Nebulosæ*, some seem to be more large, and remarkable than others; but whether they are really so, or no, I confess I have not had an Opportunity to see, except that in *Andromeda's Girdle*, which is as considerable as any I have seen. In his Maps of the Constellations, the most remarkable are the three near the Eye of *Capricorn*; that in *Hercules's Foot*; that in the third Joint of *Scorpio's Tail*; and that between *Scorpio's Tail* and the *Bow of Sagittary*. But if any one is desirous to have a good View of these, or any other of the *Nebulosæ*, it is absolutely necessary that he should make use of very good Glasses, else all his Labour will be in vain, as I have found by Experience, and before noted.